MCU-002 / MCU-004 / MCU-005

Remote Control Units

This document describes specifications, functions, and installation of these control units.

INDEX

1. Specifications

1.1. MCU-002 / MCU-004 / MCU-005 – Summary

Item	MCU-002	MCU-004	MCU-005
Appearance			
Release	2013	2016	2018
Compatible Displays and Versions	NavNet TZtouch **v3.12** NavNet TZtouch2 **v2.03**	NavNet TZtouch **v5.01** NavNet TZtouch2 **v3.01/4.01**	NavNet TZtouch2 **v6.21** (**Not** for NavNet TZtouch)
Keys	10 keys, no rotary knob	10 keys including rotary knob	17 keys including RotoKey™
Interface	**USB**2.0	**USB**2.0	**Ethernet**, PoE, Alternative A (Type A)
Highlight	Compact keyboard	Based on MCU-002, the rotary knob is available. Controlled displays can be switched with [Switch Disp.] key and Edge Swipe can be activated with the TZTL12F/15F/2BB. Buzzer sound is also available.	More keys than MCU-004, Accessible to NavNet TZtouch2 only, via Ethernet
Remarks	-	-	The TZT2BB is compatible from the initial version 5.11. The TZTL12F/15F from v6.21.

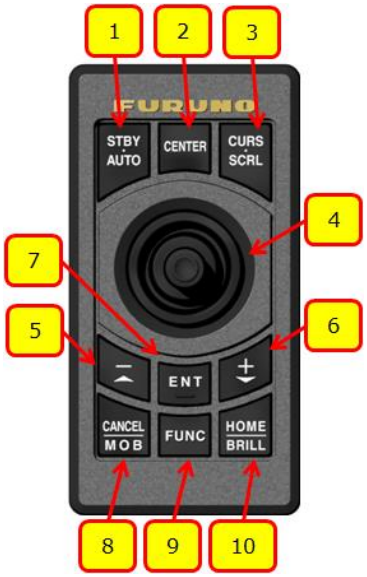
1.2. Technical Specifications

Item	MCU-002	MCU-004	MCU-005
Interface	USB2.0	USB2.0	Ethernet PoE, Alternative A (Type A)
Cable Length	Fitted with 2 m cable (USB)	Fitted with 3 m cable (USB)	Max. 10 m from PoE hub or POE injector
Power	Consumption: 20 mA (max), power supply via USB port	Consumption: 270 mA (max), power supply via USB port	Consumption: 0.1 A at 48 VDC via PoE
Water Proof	Front: IP56 / Rear: IP22	Front: IP56 / Rear: IP22	Front: IP56 / Rear: IP20
Operating Temperature	-15 to +55℃	-15 to +55℃	-15 to +55℃
Relative Humidity	94% or less at 40℃ (without internal fogging)	93% or less at 40℃ (without internal fogging)	95% or less at 40°C (without internal fogging)
Mounting	Flush mount from front	Flush mount from front	Flush mount from front

2. Operation – User Interface

2.1. MCU-002 Keys and Functions – Basic Operation

The **MCU-002** consists of **10 hardware keys** to control the TZT9/14/BB and TZTL12F/15F/2BB as described below.

MCU-002	No	Keys	Descriptions
	(1)	STBY / AUTO	Sets the NAVpilot-300/711C to STBY or AUTO modes
	(2)	CENTER	Sets the ship in the center of the screen
	(3)	CURS / SCRL	Switches the joystick functions between Cursor and Scroll
	(4)	Joystick	Moves a cursor in 8 directions
	(5)	− / ▲ (UP)	Acts as rotating RotoKey™ clockwise
	(6)	+ / ▼ (DOWN)	Acts as rotating RotoKey™ counterclockwise
	(7)	ENT	Acts as pushing RotoKey™
	(8)	CANCEL & MOB	Short presss to cancel Long press to enter an MOB point
	(9)	FUNC	Acts as Function Gesture
	(10)	HOME & BRILL	Short press to access the Home page Long press to open the Brilliance control box

2.2. MCU-004 Keys and Functions – Basic Operation

The **MCU-004** consists of **10 hardware keys** to control the TZT9/14/BB and TZTL12F/15F/2BB as described below.

MCU-004	No	Keys	Descriptions
	1	STBY / AUTO	Sets the NAVpilot-300/711C to STBY or AUTO modes
	2	HOME & BRILL	Short press to access the Home page Long press to open the Brilliance control box
	3	Switch Disp.	Switches an active display
	4	FUNC	Acts as Function Gesture
	5	CURS / SCRL	Switches the joystick functions between Cursor and Scroll
	6	CENTER	Sets the ship in the center of the screen
	7	Rotary Knob	Acts as rotating RotoKey™
	8	Joystick	Moves a cursor in 8 directions
	9	Edge	TZT9/14/BB: Same as pushing RotoKey™ key TZTL12F/15F/2BB: Activates Edge Swipe functions
	10	CANCEL & MOB	Short presss to cancel Long press to enter an MOB point

2.3. MCU-004 Keys and Functions – Differences from MCU-002

The MCU-004 keys work almost the same as the MCU-002 except for the following unique keys and features.

No	Uniqueness with MCU-004 – Overview	MCU-004 vs. MCU-002
1	A buzzer is built in.	
2	The [**Switch Disp.**] key switches an active display when there are multiple MFDs in the network.	
3	A big rotary knob offers a friendly operation similar to the RotoKey™ of TZT9/14/BB.	
4	The [**Edge**] key works differently between TZT9/14/BB and TZTL12F/15F. **TZT9/14/BB** It works the same as the [**ENT**] key of MCU-002 such as showing RotoKey™ menus and selecting the RotoKey™ or contextual menus. **TZTL12F/15F** It activates the Edge Swipe functions. Instead of swiping the screen from the top, bottom, right, or left edge, press the [**Edge**] key and move the joystick in the same direction as you edge-swipe with your finger. [**Edge**] + Joystick [**Up**] : Layer [**Edge**] + Joystick [**Down**] : Quick Access page [**Edge**] + Joystick [**Right**] : Data Box [**Edge**] + Joystick [**Left**] : Universal setting options	

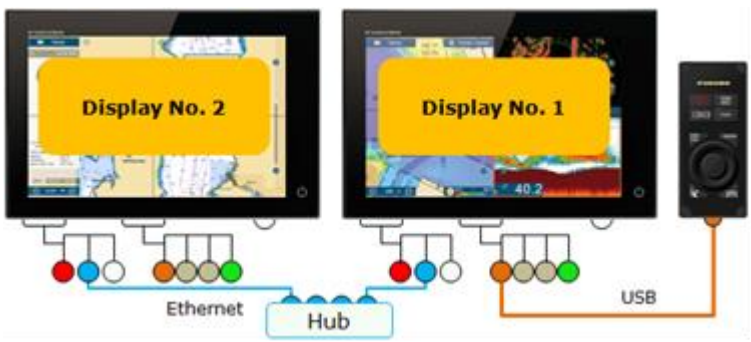
(1) Buzzer

A buzzer is built in. When an alarm is generated on the display, the sound will be heard at the MCU-004.

(2) Switch Disp.

The [**Switch Disp.**] key switches an active display when there are multiple MFDs in the network.

In the example at right, there are two (2) displays. The MCU-004 is connected to Display No. 1. By default, the MCU-004 controls Display No. 1. Pressing the [**Switch Disp.**] key, the MCU-004 now controls Display No. 2. **Section 4** describes how to group controllable displays in the network.



(3) Large Rotary Knob & Joystick

The large rotary knob offers a friendly operation for zoom in/out similar to the RotoKey™ of TZT9/14/BB. The big joystick makes it easier to move the cursor. With TZTL12F/15F v3.01 and higher, pushing the joystick selects the highlighted items in contextual menus, settings, Layer, etc.

(4) Edge Key

The [**Edge**] key works differently between TZT9/14/BB and TZTL12F/15F.

TZT9/14/BB

It works the same as the [**ENT**] key of MCU-002 such as showing RotoKey™ menus and selecting the RotoKey™ or contextual menus.

TZTL12F/15F

(1) It activates the Edge Swipe functions. Instead of swiping the screen from the top, bottom, right, or left edge, press the [**Edge**] key and move the joystick in the same direction as you Edge Swipe with your finger.

(Sample Screen: Layer)

[**Edge**] + Joystick [**Up**] : Layer

[**Edge**] + Joystick [**Down**] : Quick Access page

[**Edge**] + Joystick [**Right**] : Data Box

[**Edge**] + Joystick [**Left**] : Universal setting options

(2) The [**Edge**] key also works to select the highlighted items in contextual menus, etc. like pushing the joystick.

Tip – TZTL12F/15F v3.01 or later with MCU-002 for Edge Swipe

With the **MCU-002** connected to the **TZTL12F/15F v3.01**, the MCU-002 [**ENT**] key works the same as the MCU-004 [Edge] key. **Edge Swipe** functions are accessible by pressing the MCU-002 [**ENT**] key and moving the joystick.

2.4. MCU-005 Keys and Functions – Basic Operation

The **MCU-005** consists of **full keys** to control the TZTL12F/15F/2BB as described below.

No	Key	Descriptions
1	Power status	The LED shows the status of MCU-005 power.
2	SCROLLING	Chart, Radar, and Fish Finder screens are scrolled.
3	SHIP/3D	Short press: The screen goes back to the vessel position, i.e. Center Vessel, Center Radar, Cancel History. Long press: The chart screen goes into the 3D mode.
4	RANGE	Chart, Radar, and Fish Finder ranges are adjusted.
5	RotoKey™	Chart, Radar, and Fish Finder ranges are adjusted by rotating the knob. Menu items can be selected by rotating and pushing the knob.
6	STBY/AUTO	Short press: The AUTO mode of NAVpilot-700/300 is activated. Long press: The AUTO mode of NAVpilot-700/300 is deactivated (STBY).
7	POINTS/ROUTE	Short press: A point is entered at the cursor position. Long press: A route is created from the cursor position.
8	CURSOR	The cusor can be moved.
9	Left Click	Clicking the left-click key pops up a contextual menu or select a menu item.
10	Right Click	The righ-click key activates the Function Gesture.
11	Edge Swipe	The Edge Swipe function is activated: Press this key and press left/right/top/bottom arrows on the CURSOR key to activate one of the Edge Swipe functions.
12	CTRL	An operational screen is switched from one to another when multiple screens are connected to the TZT2BB or multiple TZTL12F/15F and TZT2BB are networked.
13	CANCEL/MOB	Short press: Current operation is cancelled. Long press: An MOB point is entered.
14	HOME/BRILL	Short press: The HOME page opens. Long press: The Brilliance control window opens.

15	MENU	The Settings page opens.
16	GAIN/TX	Short press: Gain/Sea/Rain of Radar and Gain of Fish Finder are adjusted in combination with the RotoKey™. Long press: Radar or Fish Finder is set to TX or STBY.
17	EVENT	An event is entered to the own ship position.

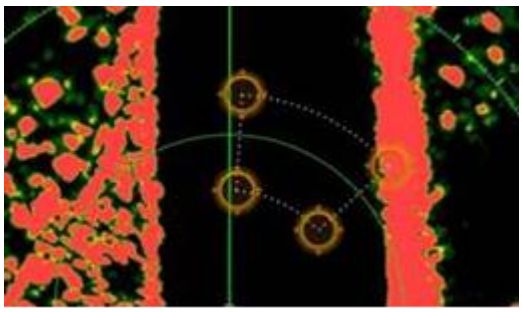
2.5. Cross Cursor

While the cursor is operated with the joystick, a cross cursor is shown on the screen.

Cursor Speed Adjustment	Cross Cursor on Screen
 The cursor speed is adjustable in the menu. [Menu] (TZT9/14/BB) / [Settings] (TZTL12F/15F) – [General] – [Cross Cursor Speed]	

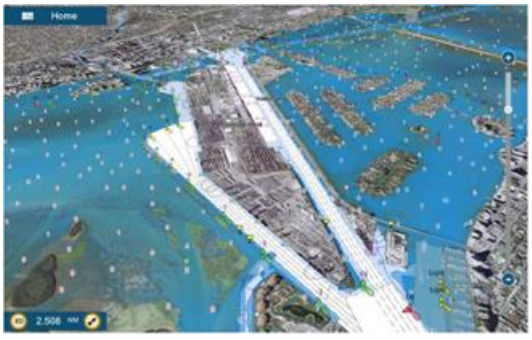
2.6. General Limitations and Notes

(1) Limitation in Drag by Joystick (MCU-002 and MCU-004)



The joystick has **NO** **"drag" function**. The guard zone setting of Radar, which requires to be adjusted by drag, will not be available with the MCU-004 joystick. This operation should be made by touch operations or with a generic mouse/trackball unit.

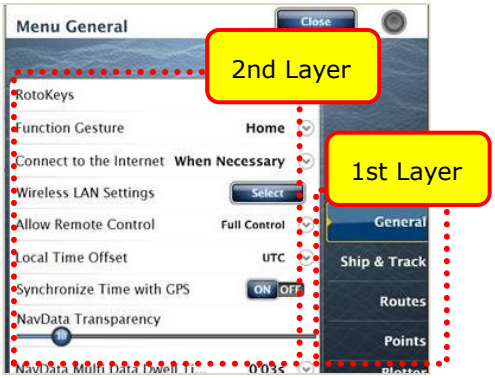
(2) Limitation in 3D Mode – Pan/Tilt (MCU-002 and MCU-004)



You can turn the screen mode into the 3D mode by selecting [3D Mode] from the contextual menu. However, **you cannot pan/tilt the chart with the MCU-002/4,** because sliding the screen with two fingers is the only way to pan/tilt it. The 3D chart will always be at the default angle as shown at right. Or if you have paned/tilted the chart with two fingers before, the screen will be in the previously set angle.

(3) Note on Menu – Second Layer (MCU-002 and MCU-004 with TZT9/14/BB Only)

The first layer of the Menu can also be scrolled with the [**-/▲**] and [**+/▼**] keys, but the second layer cannot. We recommend that the arrow icons on the top and bottom of the layer be pressed with the joystick to scroll the second layer.

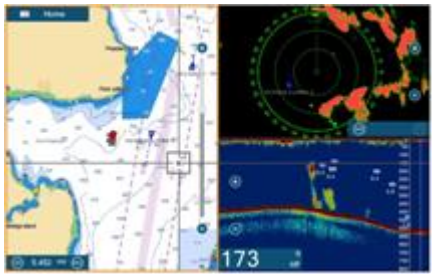


(4) Note on Virtual Keyboard (MCU-002, MCU-004, and MCU-005)

To enter characters and numbers with a virtual keyboard, use the joystick or the RotoKey: Place the cursor on a required key and push the joystick. Or use the Rotokey to highlight the required key and push the RotoKey in.

(5) Note on Active Window (MCU-002, MCU-004, and MCU-005)

In the split screen mode, even if you place a cursor on a different screen, the window will *not* be active. Make sure to press any key, such as joystick, on the screen similar to how you tap the screen to activate it.



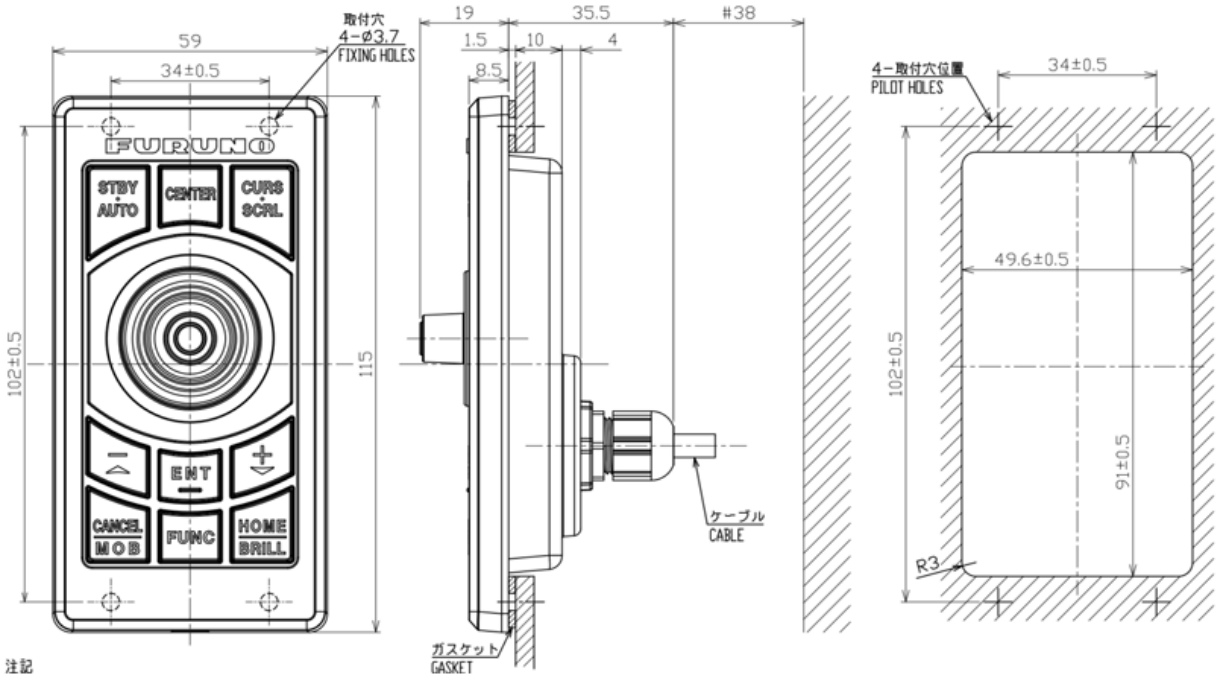
(6) Note on Power On (MCU-002, MCU-004, and MCU-005)

It is *not* possible to turn on the display with the MCU-002/4/5. Make sure to press the power key of the TZT9/14/BB and TZTL12F/15F/BB. However, the power can be turned off with the operation of [**HOME & BRILL**] key: Press [**HOME & BRILL**] key and select [**Power Off This Device**] or [**Power Off Network**] with the joystick or rotary knob.

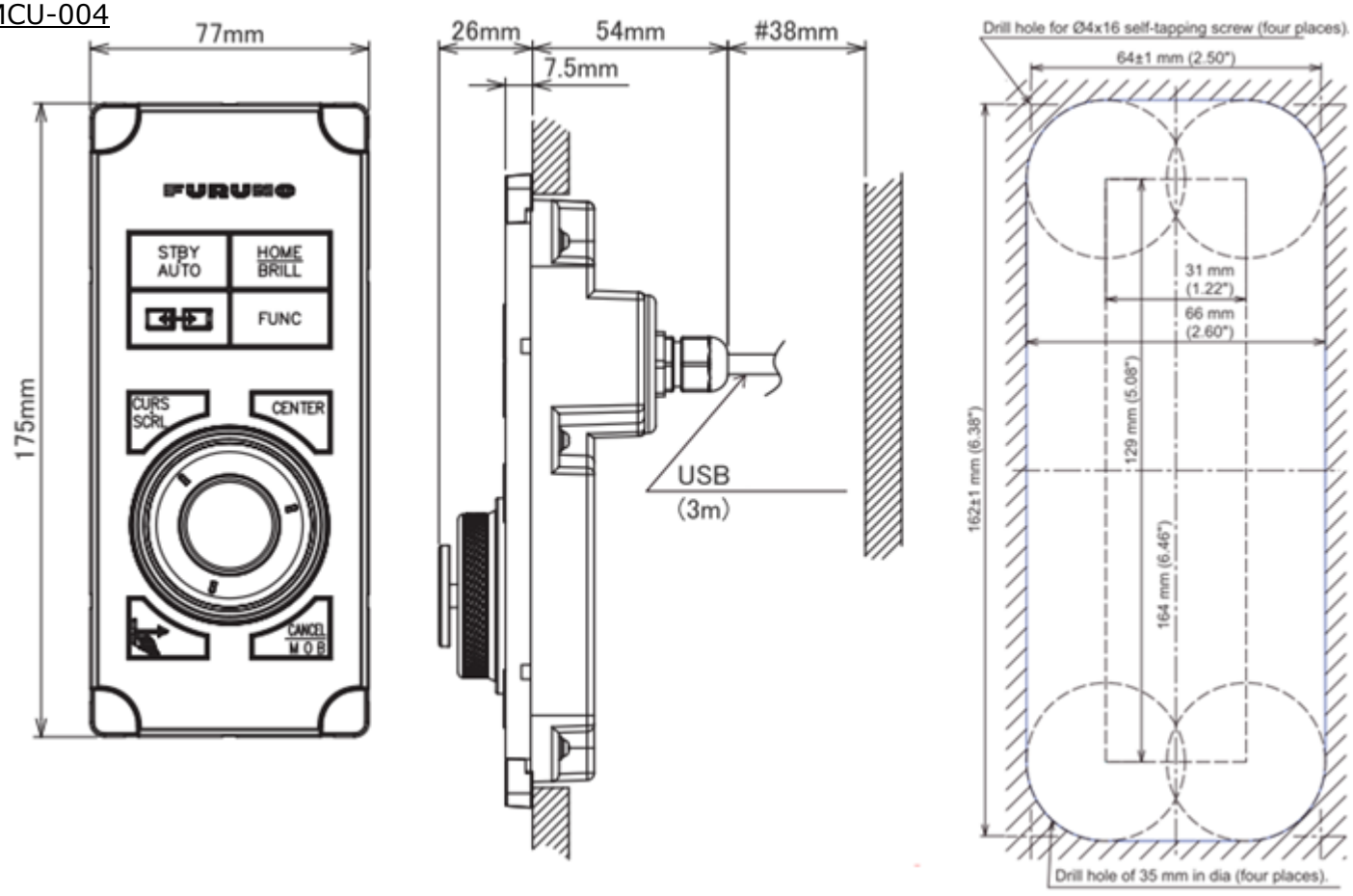
3. Installing MCU-002 and MCU-004

3.1. Dimensions

MCU-002

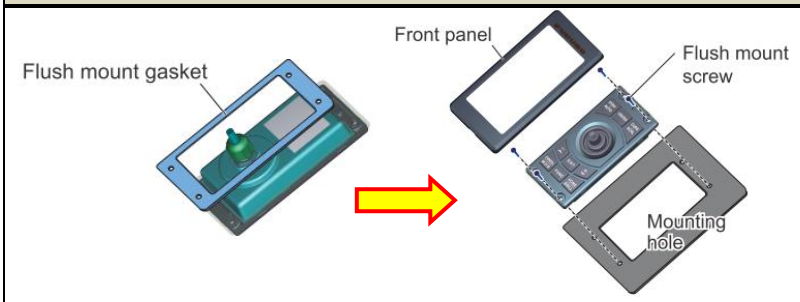
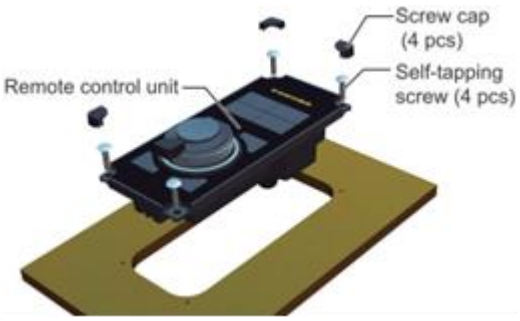


MCU-004



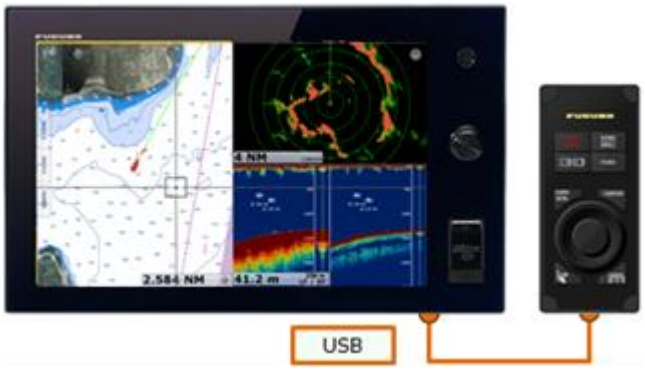
3.2. Flush Mounting

The MCU-002 and MCU-004 can be **flush mounted** on a console from the **front side** as shown below.

MCU-002	MCU-004
 *(Extracted from User Guide)*	

3.3. Interconnection

The MCU-002 and MCU-004 can be used with the TZT9/14/BB and TZTL12F/15F/2BB by **USB** connection. Connect the MCU-002/004 to the USB port of the TZT9/14/BB and TZTL12F/15F/2BB as shown in the following examples. The image of MCU-004 is used in these illustrations.

TZTL12F/15F/2BB with MCU-002/004	TZT9/14/BB with MCU-002/004
	

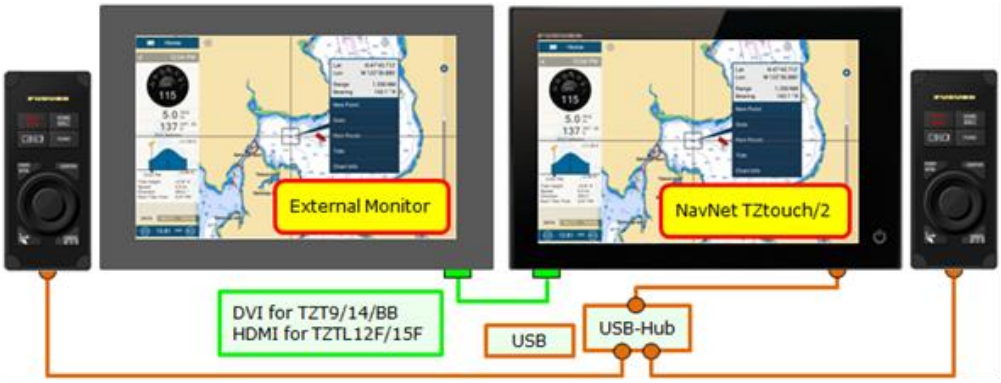
Notes:

(1) **<u>A maximum of two (2) sets of MCU-002/004</u> can be connected to <u>one (1) display</u>** via USB.

(2) The maximum current consumption of the MCU-004 is 270 mA. To use a USB hub to connect multiple sets of MCU-004, select a USB hub considering its supply current.

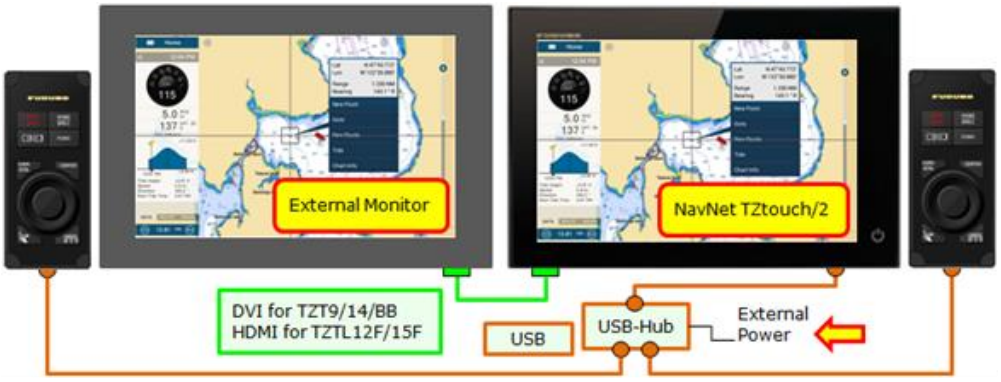
Example 1

A USB hub without external power supply may be used to connect multiple sets of MCU-004, when it has enough supply current for the connected units.



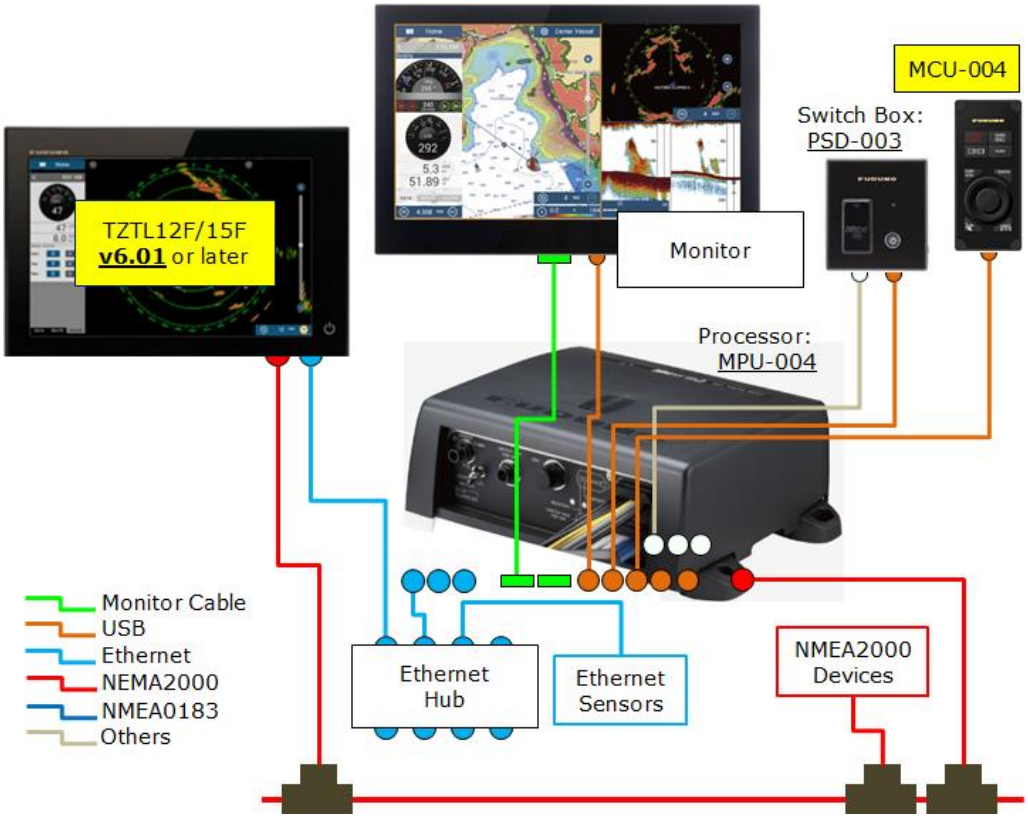
Example 2

A USB hub with external power supply may be used to supply enough power to multiple sets of MCU-004.



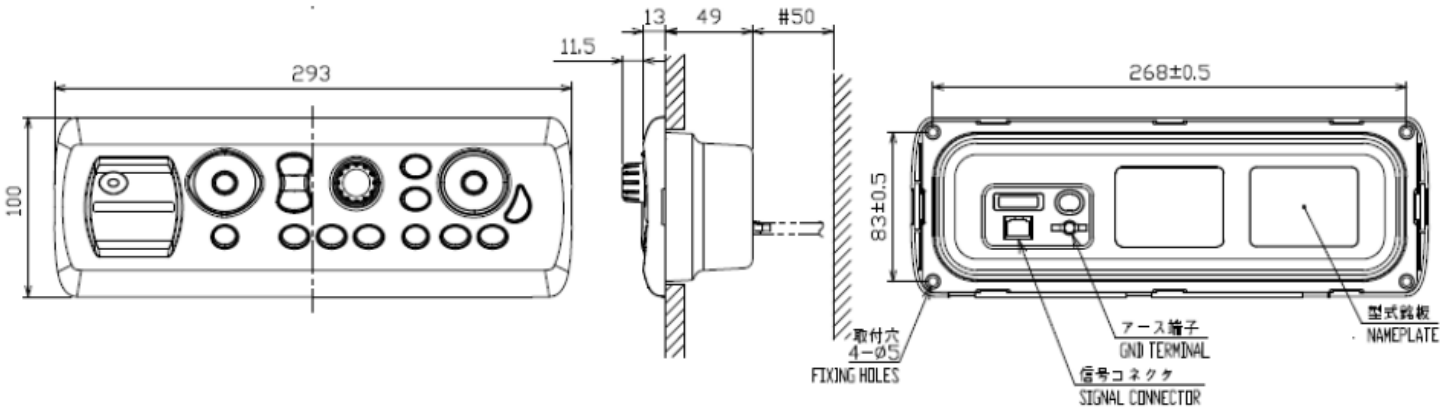
3.4. MCU-004 with TZT2BB and TZTL12F/15F

In this example, the TZT2BB with MCU-004 and TZTL12F/15F are networked. **Make sure that the TZTL12F/15F version is 6.01 or later** in order to switch the controllable display with the [**Switch Disp.**] key on the MCU-004. The controllable display will **NOT** be switched from the TZT2BB to the TZTL12F/15F if the version is 5.03 or earlier.



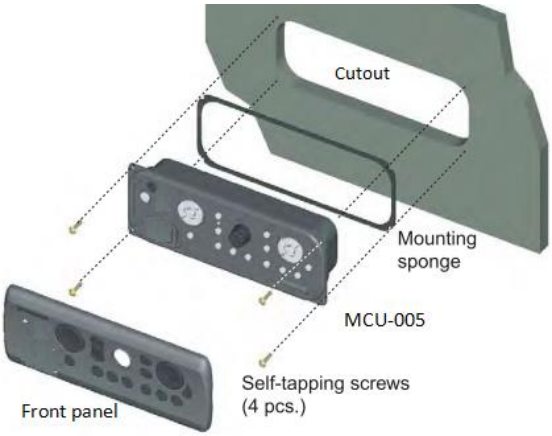
4. Installing MCU-005

4.1. Dimensions



4.2. Flush Mounting

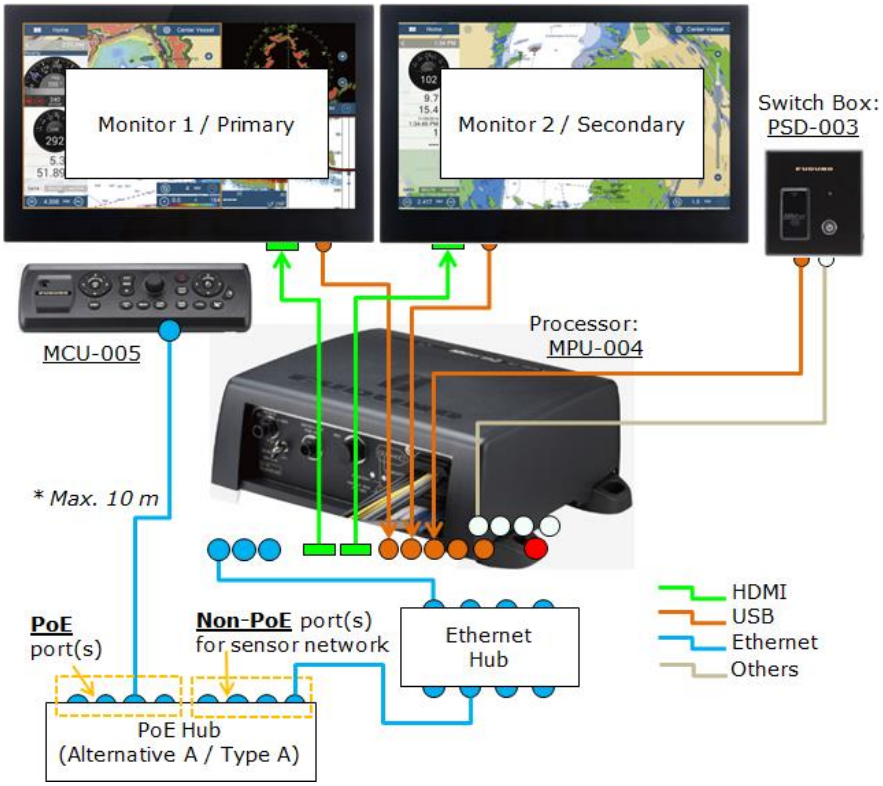
The MCU-005 can be **flush mounted** on a console from the **front side** as shown at right.



4.3. Interconnection

The full keyboard unit **MCU-005** supports full operation of TZTL12F/15F/2BB by hardware key operation. In order to utilize the MCU-005 in the network, connect the MCU-005 to a **PoE hub (Alternative A / Type-A), or POE injector, max. 10 m from the PoE hub/injector**.

Network the PoE hub with a non-PoE hub for sensor network.



PoE Hub Requirement (if not using the supplied POE injector)

A PoE hub for the MCU-005 should be compatible with Alternative A (Type A).

PoE stands for **Power over Ethernet**. In additon to data comunication, power is supplied through an Ethernet cable. Power feeding of PoE has two (2) types: **Alternative A (Type A)** or **Alternative B (Type B)**.

Alternative A (Type A):

Alternative A is also described as **Type A**. While pins #1/2/3/6 of Ethernet cable are used for data communications, the same pins are used to feed the power to a connected device. **The MCU-005 is compatible with this type.**

E.g.

Manufacturer : **NETGEAR**

Model : **GS108PE**

URL: https://www.netgear.com/business/products/switches/web-managed/GS108PE.aspx#tab-techspecs

Alternative B (Type B):

Alternative B is also described as **Type B**. While pins #1/3/4/6 of Ethernet cable are used for data communications, the other pins #4/5/7/8 are used to feed the power to a connected device. The MCU-005 is **NOT** compatible with this type.

5. Grouping MCU-004 and MCU-005

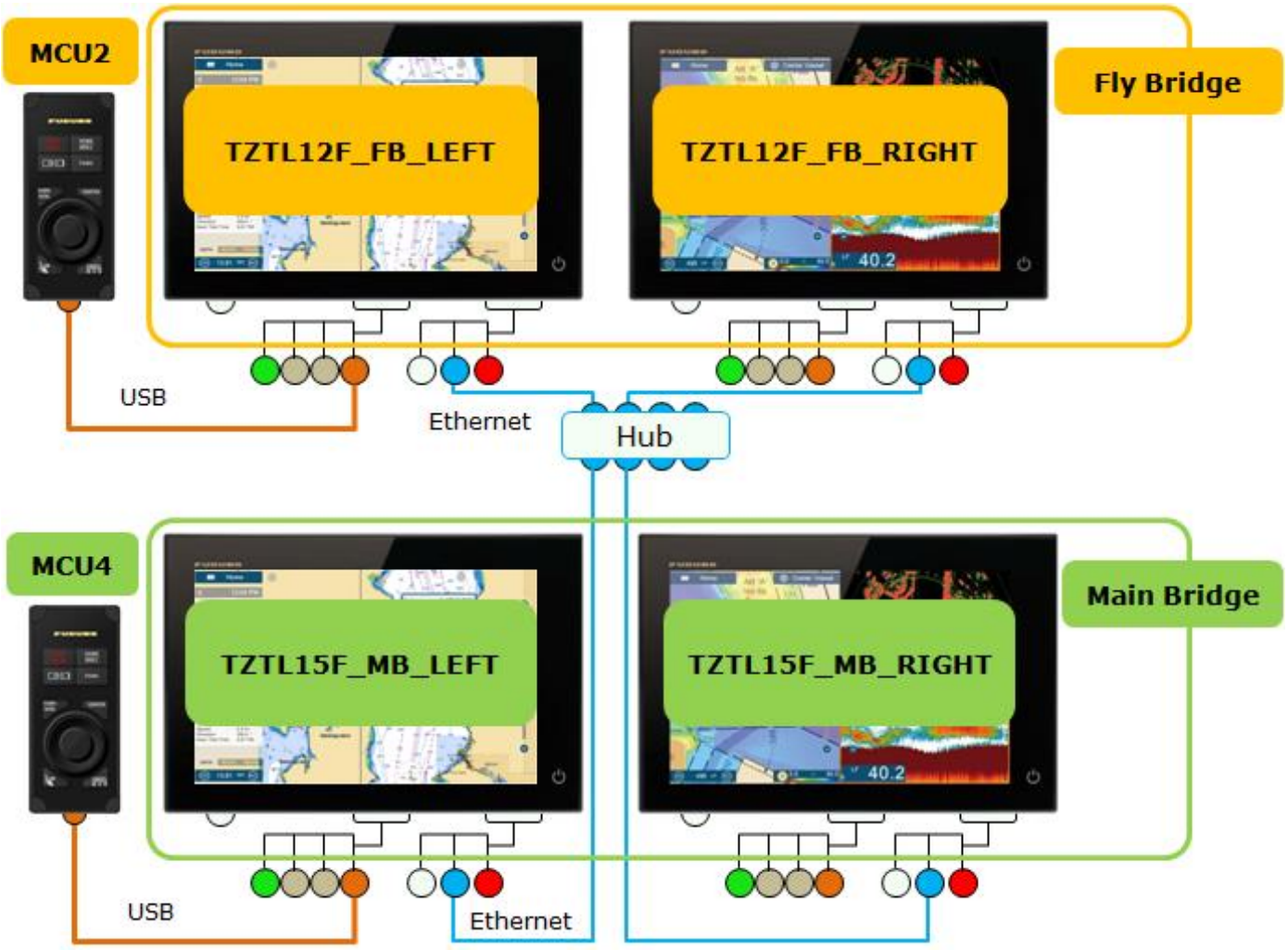
With one (1) MCU-004 connected to one of the displays or one (1) MCU-005 networked in the Ethernet, **the controllable display can be switched in the network**.

Note:

The MCU-004 works with both NavNet TZtouch (TZT9/14/BB) and TZtouch2 (TZTL12F/15F/2BB), and the MCU-005 with NavNet TZtouch2 (TZTL12F/15F/2BB) only. When the MCU-005 is installed in the integrated network of NavNet TZtouch and TZtouch2 MFDs, the MCU-005 controlls the TZTL12F/15F/2BB only.

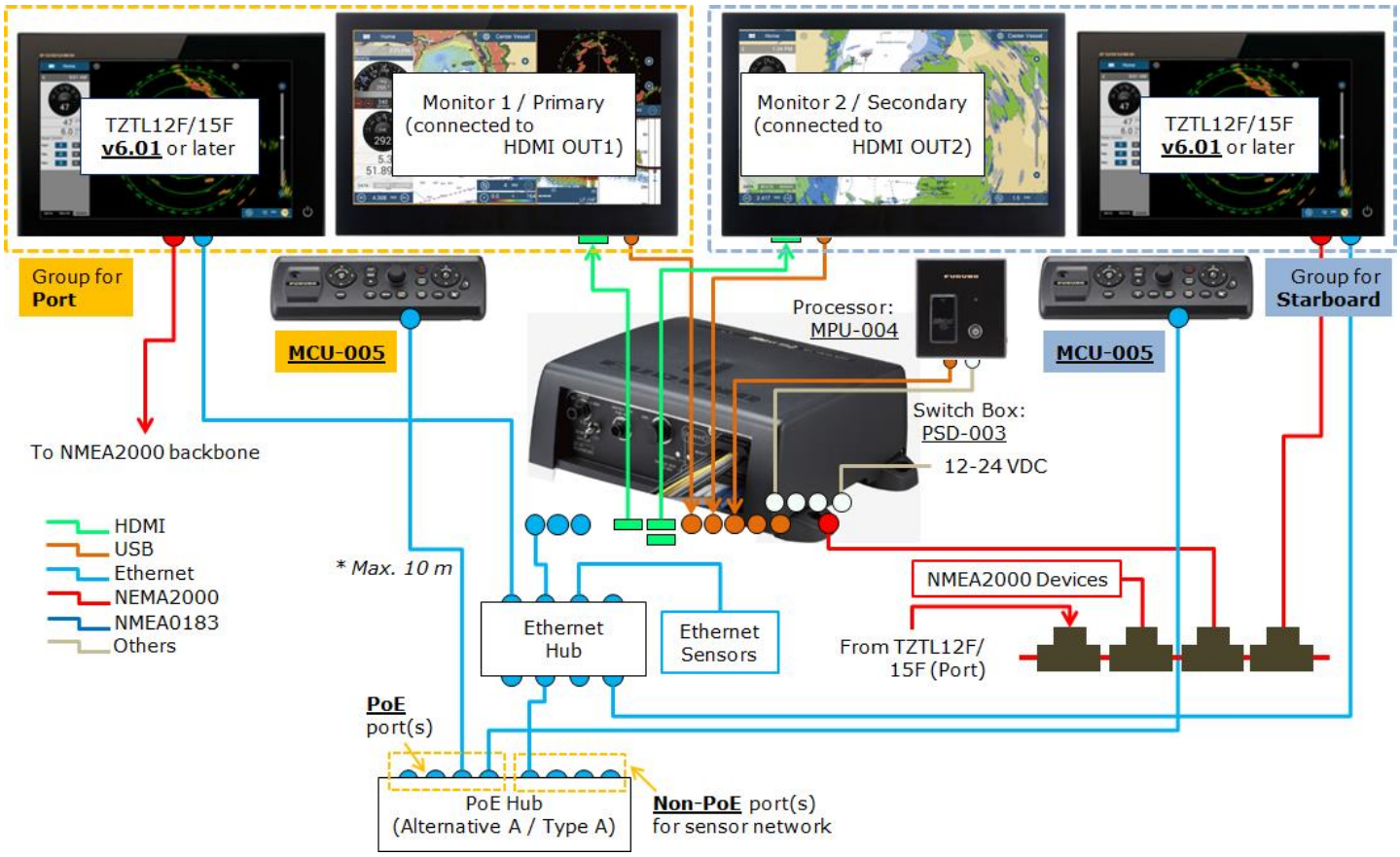
5.1. MCU-004

As an example, displays at the main bridge and fly bridge should be operated independently. In this case, displays should be separated in two (2) groups. In the following example, a total of four (4) sets of TZTL12F/15F displays are installed at the main and fly bridges and networked with each other. One each of MCU-004 is connected to the TZTL12F/15F at both bridges. The MCU-004 at the fly bridge will be set to control the displays at the fly bridge, while the MCU-004 at the main bridge will be set to control the displays at the main bridge.



5.2. MCU-005

In the following example, one (1) TZT2BB processor is connected with dual displays and networked with two (2) TZTL12F/15F v6.21. Two (2) MCU-005 units are installed at port and starboard sides and customized to control the displays at the port and starboard respectively.



5.3. Grouping Controllable Displays

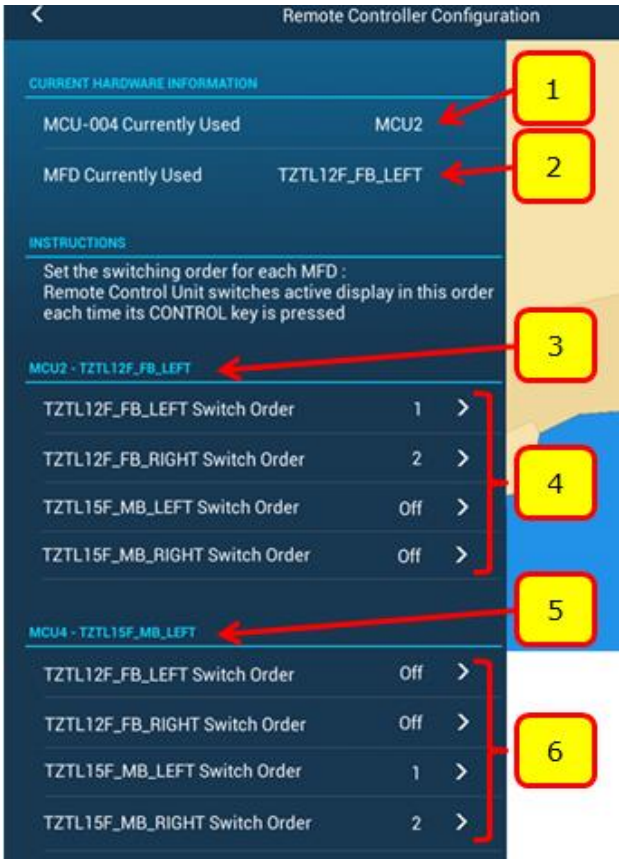
Grouping procedures are described below based on the configuration in **Section 5.1** (MCU-004). The same procedures also apply to the MCU-005 network.

Preparation – Check in Advance

(1) All the displays in the network are turned on.
(2) All the MCU-004 units to be used are connected.
(3) Unique nicknames are assigned to all the displays in order to identify the display location easily.

Setting Procedures

(1) Access [Settings] – [Initial Setup] – [**Remote Controller Configuration**].
With the MCU-004 detected, the [**Remote Controller Configuration**] setting will be available.
(2) Select [**Remote Controller Configuration**] and see that the setup page shown at right appears.
(3) Make settings referring to the table below.



No	Descriptions
1	[**MCU Currently Used**] represents the **MCU-004 that you are operating now**. The multiple MCU-004 units in the network will be assigned with unique numbers such as [**MCU1**], [**MCU2**], etc. In this example, [**MCU2**] is in use, but the indication will change as you operate a different MCU-004. When the MCU-004 is connected via a USB-hub, the numbering rule depends on the hub's specifications.
2	[**MFD Currently Used**] represents the **nickname of the own display that opens the [Remote Controller Configuration]**. In this example, this menu is opened on the [TZTL12F_FB_LEFT].
3	[**MCU2 – TZTL12F_FB_LEFT**] represents that the **[MCU2] is physically connected to the [TZTL12F_FB_LEFT]**.
4	With these setting options, the **controllable display(s) with the [MCU2]**, as well as the **switching order of active displays** can be set. You can see that all the nicknames of available displays in the network are listed. The numbers [**1**], [**2**] represent the switching order of the active display when the [**Switch Disp.**] key is pressed. [**Off**] represents that the [MCU2] will **NOT** access the display(s). In this example, the [MCU2] is set to control two displays at the fly bridge, but no access to the other two displays at the main bridge. When the [**Switch Disp.**] key is pressed, the [MCU2] switches the active display in the order of [TZTL15F_FB_LEFT] first and [TZTL15F_FB_RIGHT] next.
5	You can see that the other MCU-004 named [**MCU4**] is **physically connected to the [TZTL15F_MB_LEFT]**.
6	In this example, the [MCU4] accesses the main bridge displays only and switches the active display in the order of [TZTL15F_MB_LEFT] first and [TZTL15F_MB_RIGHT] next.

(4) Select [**Confirm**] to save the settings.

6. Limitation by Display Versions

Make sure that the latest software versions of NavNet TZtouch and TZtouch2 are installed to use the MCU-004 (for NavNet TZtouch/TZtouch2) and MCU-005 (for NavNet TZtouch2). Old versions have limitations in available functions as shown in the following table.

NavNet TZtouch with MCU-004	Remarks
V4.21 or earlier (released in 2016)	Buzzer sound will **NOT** be generated from the MCU-004. [Switch Disp.] key will **NOT** work. The Grouping function is **NOT** available.
V5.01 to **5.03** (released in 2017)	Buzzer sound, [Switch Disp.] key, and Grouping function are available. With the MCU-004 connected to the TZT2BB, the controllable display will **NOT** switch to the TZTL12F/15F.
V6.21 or later (released February 2019)	With the MCU-004 connected to the TZT2BB, the controllable display can switch to the TZTL12F/15F.

NavNet TZtouch2 with MCU-004 and MCU-005	Remarks
V3.01 (released in 2016)	The **MCU-004** is connectable from the version, but the Grouping function is **NOT** available.
V4.01 (released in 2016)	The **Grouping** function is available with the **MCU-004**.
V6.21 or later (released February 2018)	The **MCU-005** is networkable. The Grouping function is available for both MCU-004 and MCU-005.

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